ASTRONOMY

DEPARTMENT OFFICE
Darwin Hall 300
(707) 664-2119
http://phys-astro.sonoma.edu

DEPARTMENT CHAIR
Lynn R. Cominsky

ADMINISTRATIVE COORDINATOR
Andrea Cullinen

Faculty

Lynn R. Cominsky
Jeremy S. Qualls
Scott A. Severson
Hongtao Shi
Thomas Targett

Program Offered

Minor in Astronomy

Astronomy, offered as a minor in the Department of Physics and Astronomy, is the study of the planets, stars, and galaxies in the universe beyond the earth's atmosphere. The fields of astronomy and astrophysics, the application of physics principles to astronomical observations, today deal with essential questions, such as the origin and nature of the "Big Bang;" the subsequent creation of matter and the chemical elements; the eventual formation and evolution of structure in the universe; and the life cycles of stars, including the tremendous explosions which are often their death knells and can lead to the formation of black holes. Modern astronomy leans heavily on the concepts and techniques of physics and mathematics. Astronomers use ground- and space-based instruments that detect photons spanning the electromagnetic spectrum, as well as particles such as cosmic rays or neutrinos. An emerging branch of astronomy seeks to correct the effect of the Earth's turbulent atmosphere using adaptive optics, thus providing "sharper" views of the universe. As a result of astronomy's cosmic scope and dependence on physics, degrees in astronomy are generally granted at the graduate level. The minor in astronomy, with a B.S. in physics, is an excellent preparation for graduate study in astronomy or astrophysics.

Careers in Astronomy

Career fields for which an astronomy minor would be beneficial include aerospace, astronomy, atmospheric science, education, planetary geology, and geophysics.

A variety of courses are available within the minor, including intermediate and advanced laboratory work that utilizes the department's two observatories, and a number of descriptive courses for students whose major interests lie in other fields.

The SSU Campus Observatory houses two telescopes: a 14-inch Schmidt-Cassegrain and a 10-inch Newtonian. Both are computer controlled, and can be equipped with auxiliary instrumentation for CCD imaging and spectroscopy. A NASA-funded research observatory, located in the darker skies of northern Sonoma County includes a remote controlled and operated 14-inch telescope, equipped with a high-efficiency CCD detector and a filter wheel. Equipment available for observational work in astronomy by SSU students is ideally suited for studying objects that vary in time and space. This includes pulsating, eclipsing and cataclysmic star systems, the variable nuclei of active galaxies (such as quasars and blazars), gamma-ray bursts, and extrasolar planetary systems that exhibit planetary transits. Our equipment is also well-suited for follow-up observations of Near Earth Objects, which may threaten life on Earth.

The department houses a laboratory for experimental astrophysics research, where students can test and build cameras, spectrometers and other equipment for SSU's telescopes. The laboratory includes an Adaptive Optics testbed, which uses advanced technology to measure and sharpen images. The department partnered with Pomona College to construct KAPAO, a remotely operable adaptive optics system for a 1-meter telescope at Table Mountain Observatory in Southern California. Access to optical and near-infrared diffraction-limited imaging brings additional research opportunities to our students.

In November 2013, the Department launched its first CubeSat, T-LogoQube. This student-designed and built small satellite is the first in a series of planned space science missions that will make astrophysical measurements.

The on-campus observatory is used by students in laboratory and lecture courses, and all the astronomical facilities described above are available for faculty and student research projects. All students are strongly encouraged to participate in the ongoing research programs of the department, and/or to propose student-initiated research programs.

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Completion of a minimum of 20 units in astronomy and physical or life science courses, at least 12 of which must be in astronomy, constitutes a minor in astronomy. Courses that are used to meet requirements in a student's major may not be used toward the minor in astronomy. Supporting courses for the major may be used. Interested students should consult with an advisor in the Department of Physics and Astronomy.